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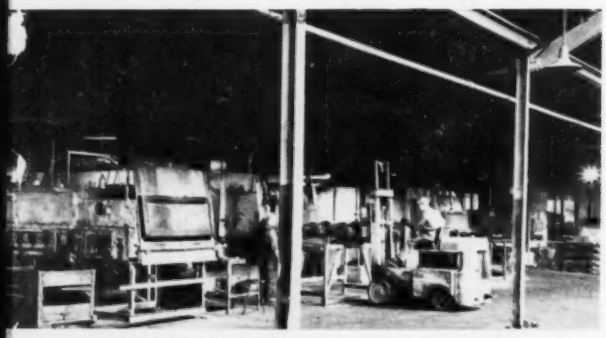
January-February 1952

MASTER CRAFTSMEN
METAL TREATING INSTITUTE

National Trade Association of

COMMERCIAL HEAT TREATERS



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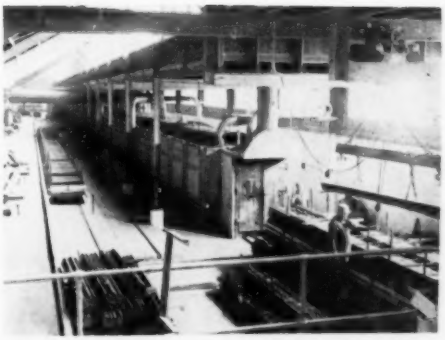

This 280 ft. continuous annealing furnace will handle material up to 40 ft. long. Production of 200 tons per day on annealing stress relieving and pack carburizing.

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From bearing races to cast iron cylinder sleeves . . .

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Write for Ajax Bulletin 120

AJAX ELECTRIC COMPANY, INC.

940 Frankford Avenue
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World's largest manufacturer of electric heat treating furnaces exclusively

AJAX HULTGREN **ELECTRIC SALT BATH FURNACES**

Editorial...

AN OLD PROBLEM REMAINS STILL UNSOLVED

The exchange of correspondence given below reveals that as of today a problem of real importance to the entire heat treating industry – a problem painfully accentuated during the last war, remains unsolved. Some facts about this were discussed in our editorial headed "Let's Profit From Experience" – METAL TREATING, May-June, 1951.

November 27, 1951

Mr. Carl Ipsen,
Industrial Heating Section,
General Industrial Equipment Division,
National Production Authority,
New G.A.O. Bldg.,
Washington 25, D. C.

Dear Sir:

Pursuant to the current defense program there has, of course, been occasion to install heat treating equipment in manufacturing plants at the expense, directly or indirectly, of the Government. Presumably such action is taken only after a determination that sufficient open or potential capacity does not exist within a reasonable distance of said manufacturer.

This Company has open capacity in various types of heat treating. Our records do not show that we have ever been queried by your office regarding our existing facilities and capacity, or our ability to expand. Upon request, we shall be glad to furnish such information as you may desire along these lines.

Reports have reached us that requisitions have been issued for facilities to heat treat certain work which could have been handled economically with facilities presently available in our plant. It is for this reason that we write you at this time.

In those cases where additional facilities are in fact required, it would seem logical to place them in the plant of an established commercial heat treater in the area, where they would be available for maximum utilization by all industry.

Your comments or instructions on this matter will be received with appreciation.

Respectfully yours,

Metallurgical Laboratories, Inc.
Horace C. Knerr, President

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METAL TREATING

Official Journal of the Metal Treating Institute

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The Dow Atmosphere Furnace

By F. E. Harris, *Engineering Consultant*
The Dow Furnace Company

Editor's Note: A new type of furnace intended for dry cyaniding, bright hardening, and allied forms of heat treatment has recently come upon the market in various designs by several furnace manufacturers.

Characteristic of these furnaces is that small parts are loaded into baskets, mechanically moved into the heating chamber, heated with forced circulation of artificial atmosphere for a desired time, mechanically moved out of the heating chamber, lowered into a quenching bath with strong forced circulation of quenching medium and mechanically raised out of the bath.

Advantages obtained from this type of furnace have created an innovation in the heat treating field, and they have been put into mass production operations in many heat treating plants.

We believe that this subject presents sufficient interest and novelty to feature a series of technical papers in METAL TREATING.

This and the article describing the Holcroft batch-type furnace (Pages 3-4) are the first two of the series. In succeeding issues it is planned to present the story of the Lindberg, Surface Combustion and Ipsen Furnaces. Our readers would be interested in the experiences of users of these units and we would welcome your comments.

Perhaps we may best begin a discussion of the Dow unit by recalling the memory of John A. Dow, who was the pioneer in the development of the semi-automatic furnace for the atmosphere heat treatment of metals. His was the bold concept of a complete package unit, capable of handling a wide variety of quality processing, with a minimum of labor, supervision and operating expense.

Certain advantages inherent in the Dow furnace (Fig. 1.) are:

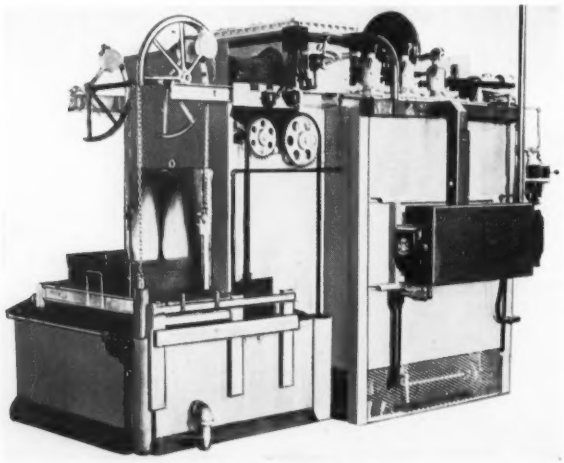


Fig. 1—The Dow Atmosphere Furnace.

1. *The Maximum Heating Rate Consistent with Temperature Uniformity of the Charge.* The "flywheel" action of refractory baffles which direct the recirculating atmosphere reduces the temperature drop induced by the cold charge and allows an extremely fast heating rate at the beginning of the cycle. The same refractory slows down the heating rate by heat absorption as the charge approaches the control temperature, and in conjunction with the positive and directed flow of atmosphere moving at high velocity, the conditions for fast and uniform heating are well met. (Fig. 2.)

2. *Accurate Control at the Temperature Setting.* A simple combustion system with three-point control (high, medium and low) allows a minimum range of heat input for holding the furnace at temperature, by means of the medium and low settings.

3. *The Application of Hot Carrier Gas to the Work Chamber Proper.* Since the supply of carrier gas is generally made at a constant rate irrespective of the cycle period, it is particularly important in a batch unit that the heating of the carrier gas does not affect the temperature uniformity of the charge. A unique and valuable feature is found in the heating and reforming of the gas in a tube enclosed by the heating leg of the radiant tube.

To those with wide experience in the field of atmosphere applications, it becomes increasingly apparent that properly applied operating principles play a very important role in maintaining a high standard of operating performance day after day. Thus, it seems necessary in discussing the flexibility of the unit to mention varied adaptations which may be possible for special process requirements. To begin with a simple example; for certain moderate case depths it may be desirable to employ a temperature of 1650°F. to make the process time a reasonable one, while the temperature at which the charge is quenched may be somewhat lower, say 1525°F. Using a previously prepared generator gas, introduced through the heating leg, the temperature of the charge may be quickly dropped by cutting off the combustion gas supply to the radiant tubes. Allowing a short equalizing period at the lower temperature, complete uniformity at the quenching temperature may be reached in a moderate time period, say thirty minutes.

Other examples of special processing, as clean hardening, may have a wide variety of desirable gas compositions, depending on the carbon content of the steel and the processing temperature, if the atmosphere is to neither carburize nor decarburize the fin-

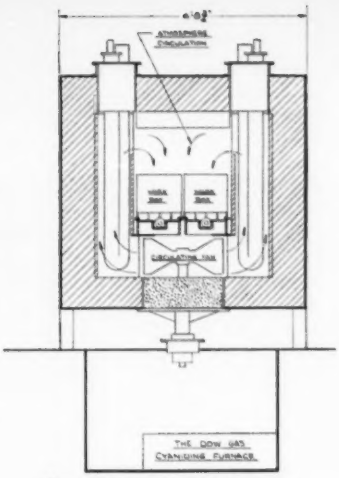


Fig. 2—Method of atmosphere circulation in the Dow Furnace.

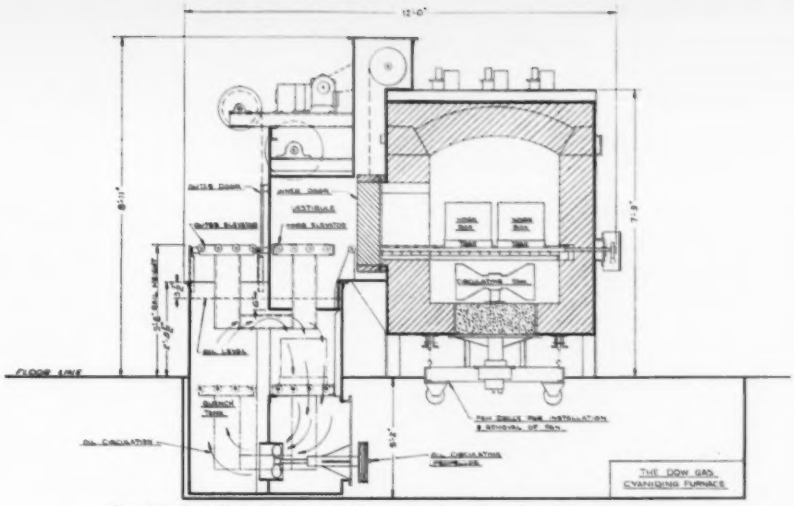


Fig. 3—Complete design details of the Dow Gas Cyaniding Furnace.

ished part. Here a controlled flow rate of a steam or purge gas addition to a carrier gas of standard composition is often the answer for precision control. Thus, a carrier gas, for example, may have a composition of 40% H_2, 20% CO and 0.1% CO_2. At 1500°F., one part steam to 40 parts carrier gas will produce a work chamber atmosphere having 1.0% CO_2. Precision control of the work chamber atmosphere is common practice with the Dow unit. In fact, the clean hardening operation may be followed directly by a carburizing cycle where the additive is now methane and no problem of conditioning is encountered.

It must not be overlooked that, just as process requirements are subject to wide variations, so the shop facilities vary where the processing is done. Much can be done, even where facilities are limited, to provide simple means for controlling work chamber conditioning so vital to precision processing and so necessary in providing trouble-free operation. These units are used for a wide variety of applications including dry cyaniding, carburizing, clean hardening, carbon recovery, and special diffusion processes, and each process has its own peculiar conditioning problems. In this connection, it must again be noted that the most satisfactory and flexible performance of atmosphere equipment will only be realized when the user has a thorough appreciation of the optimum operational procedures.

SYMPOSIUM SERIES NO. 2

Holcroft Batch Type Furnace for Controlled Atmosphere Heat Treating

by W. H. HOLCROFT
Executive Vice President and Technical Director of Holcroft & Co.

The Holcroft Batch Type Furnace has been designed to meet the demands of industry to heat treat a wide variety of parts in a controlled atmosphere. In addition to accommodating variations in the size and shape of the parts to be treated the furnace is used for clean hardening, drawing, carbon restoration, light case carburizing or carbonitriding. Operating temperatures may range from 400° to 1700° F.

The unit is fully automatic with one operator being able to service several furnaces. On automatic cycle, the operator needs only to guide the tray containing four loaded baskets over gravity rolls from a transfer car into the furnace vestibule. (Fig 1.) The vestibule door is closed manually and the cycle started by a push button.

After a predetermined atmosphere flushing interval, controlled by a timer, the door to the furnace chamber opens and the transfer racks in the furnace

Fig. 1—Loading the Holcroft Atmosphere Furnace.

move out under the tray in the vestibule. The elevator then lowers sufficiently to deposit the tray on the racks which then move back into the furnace and the furnace door closes.

When the timer controlling the heating cycle "times out," the furnace door opens and the tray is transferred to the vestibule where it is picked up by the elevator as it moves into its "up" position. The transfer racks then retract and the furnace door closes. The elevator lowers the work into the oil where it remains for the time allotted and then returns to the normal position for unloading. A series of lights indicate the flushing, heating and quenching cycle and also the completion of the cycle when the furnace is ready for unloading. All of the operations may be performed independently by means of push buttons.

This unit incorporates the furnace chamber, vestibule and the quench tank in one compact unit. The quench tank is at the same level as the furnace and therefore no pits are required, this feature alone providing some attractive installation savings. (Fig. 2.)

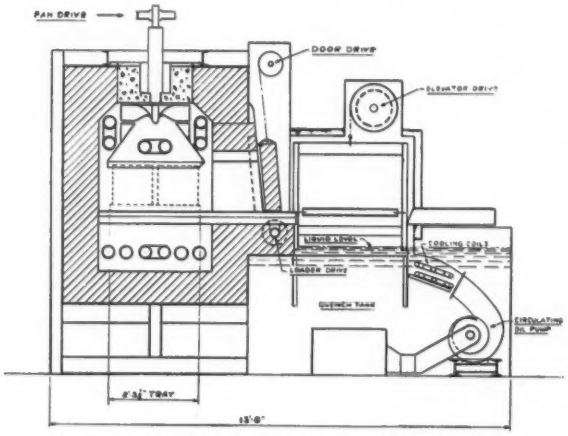


Fig. 2—Design of the Holcroft Furnace and Quench Tank.

The floor space required for the unit is approximately 97 square feet, small enough to be fitted into a production line layout; should production requirements change, the entire furnace can be moved to a new location as a unit.

A temperature build-up feature has been developed (patent applied for) to offset the initial drop of temperature when cold stock is introduced into the furnace chamber. When the stock leaves the furnace chamber, an additional contact on the temperature control allows the burners to build up a temperature head in the furnace chamber, higher than that required for the normal operating temperature. When the cold stock enters the furnace chamber, the normal operating temperature control is resumed. As result of this temperature build up, the heating-up time of the stock is greatly reduced. The heating is accomplished by six gas fired return bend radiant tubes in banks of three above and below the work. With slight changes in the radiant tube location, the furnace can be heated by coiled electric resistance units.

The thermocouple for recording stock temperature is so placed as to record the true temperature of the work without any misleading variations due to influence from the heating tubes.

Work can be quenched in water, cold oil, hot oil or slow cooled in a controlled atmosphere in the vestibule. The quench oil temperature is automatically controlled by combination heating and cooling coils in the tank. Water or steam is introduced into these coils to maintain a constant oil temperature. In the case where hot oil quenching is desired (350° F.—400° F.) gas fired heating coils are used. The vestibule is water cooled so that the work can be slow cooled in a controlled atmosphere if so desired. Work can also be quenched in an external salt bath and drawn in an accompanying batch type draw furnace.

When a wide variety of parts are processed in this unit, a difference in the density of the loading will be encountered. This necessitates a proper agitation of oil so as to quench all types of loadings, light or dense. A circulating oil pump has been designed and built to deliver a large volume of oil through the stock at a medium pressure head. The pump uses a variable speed transmission for controlled agitation.

An alloy rack and pinion arrangement is used to move the trays in and out of the furnace chamber. This type of mechanism means less tray warping and lower maintenance because the trays are never pushed or pulled while hot and as a result no unnecessary stresses are introduced.

The tray although light in weight, will support up to 250 pounds per square foot and will hold a full furnace charge of four baskets providing 7½ square feet of usable hearth area. The tray is flexible so that cracking in the quench is held to a minimum.

A vestibule is incorporated in this furnace for the purpose of maintaining a controlled atmosphere in the furnace chamber, free of contaminating gases which would impart undesirable surface discoloration, decarb or oxide. The vestibule is completely flushed by a high flow of generator gas. The vestibule is large enough to accommodate a full furnace charge, one tray with four baskets, so that the entire load can be quenched at one time. Thus an unusually high ratio of usable treating time to total cycle time is obtainable. In a typical installation with three minutes allowed for flushing, two minutes for quenching and three minutes for loading and unloading and with a total time of 1¼ hours, the loading and unloading, flushing and quenching represent only 10% of the total cycle.

A circulating fan is installed in the top of the furnace to give uniform forced circulation of the heated atmosphere throughout the load. The fan is mounted on precision bearings and the main shaft is water cooled. The unit has a built-in atmosphere generator as optional equipment.

Salt Bath Quenching of High Speed Steel

By WALTER E. PETERSON
Chief Metallurgist, Gorham Tool Co.
Detroit, Mich.

As a matter of introduction I might mention that we manufacture a variety of high speed cutting tools, milling cutters of all types, metal slitting saws, end mills, tool bits, form cutters and crankshaft turning tools, to name a few. Because the founder of our company so firmly believed in the advantages of the molybdenum grades of high speed steel and knowing its inherent characteristic to decarburize in most controlled atmosphere furnaces unless extreme care was exercised, a four furnace salt bath unit was installed in 1945, with highly gratifying results.

As originally set up at that time the quench unit utilized cyanide contained salt. It was a fluid bath and one in which the salt was easily removed from the quenched tools by washing. But it was not long before we became conscious of its drawbacks. The cyanide pickup on the surface of the tool was in many cases detrimental to the tool, causing chipping on the cutting edge. Also, the salt carry over from this high heat bath soon caused the quench bath to become sluggish.

The cyanide contained quenching salt was therefore replaced by the alkali-chloride type salt containing calcium,- barium- and sodium-chloride. This type salt was chosen because of its low melting point and wide working range. This bath was able to absorb a greater amount of carry over salt before becoming sluggish than was the cyanide contained salt. Its quenching characteristics were good although it was more difficult to remove from the tools on cleaning. The addition of approximately ¾ percent sodium cyanide to the bath improved its washing characteristics with no apparent cyanide pickup on the tool surfaces. The addition of this small amount of sodium cyanide also aids in extending the life of the metal pots but would be detrimental if ceramic pots were used. This type quenching salt was discontinued though after approximately one year of use. An epidemic of rusting during the spring of the year was finally traced to the quenching salt in the fall when a second epidemic occurred. Even with the utmost care being exercised in washing it was difficult to entirely remove all traces of the quenching salt and since it is hygroscopic it will pick up water and so cause rusting.*

Fig. 2—Operator is salt bath quenching a load of high speed steel tools. High heat bath is to left.

Fig. 1—3 units of a 4-bath high speed steel salt bath furnace set-up. Operator is preparing to remove a load of tools from high heat unit.

Consequently we again changed quenching salts. We still use the alkali-chloride type but one with less calcium chloride in its make-up. Chemically it contains calcium, barium, sodium and potassium chloride. It is less hygroscopic than the previous type used, its quenching characteristics do not appear to be quite as good but this point is debatable, and it has not proved difficult to remove in washing – except from tapped holes. Here also we add approximately ¾ of 1 per cent cyanide.

Other than to periodically desludge the bath to remove the high-heat salt "carry over" and to replace the salt removed with fresh quenching salt, little main-

(Continued on page 11)

**This is a characteristic often found with salts containing calcium chloride—Ed.*

New Equipment Permits Use of Natural or Artificial Gas in Flame Hardening

By Dr. H. W. Groenegress
*Gevelsberg, Germany**

Flame hardening has established itself as an economical process for the heat treating industry. It belongs in the group of hardening processes by quenching and is largely used for surface hardening of hardenable steel. In order to keep the case thin enough, the surface, which is to be protected against wear, must be so rapidly heated that the heat is dammed up at the surface. This causes a quick rise in temperature in the outer layer beyond the critical point, while the core remains unaffected by the heat treatment. In order to limit the heating to the part of the surface which is to be hardened, the burners must be so shaped as to follow the contour of the workpiece.

The introduction of flame hardening in Germany has been greatly enhanced since 1934 by the use of manufactured gas or so-called city gas instead of acetylene. This process was developed by Paul Ferd. Peddinghaus, Gevelsberg, Westphalia.

Up to that time it had been the general opinion that the necessary concentration of heat, as required for successful flame hardening, could only be achieved by the oxy-acetylene flame. However, experience demonstrated that the heat value alone was not the only qualifying factor of a gas for flame hardening.

Heat value, flame velocity and oxygen admixture determine the combustion process and the heat content of the combustion gases per cubic foot. This heat content is practically the same for acetylene as for manufactured gas in spite of the large difference in heat value.

Although in the United States acetylene gas is almost exclusively used for flame hardening up to the present day, city or manufactured gas is now predominately employed in Germany. This development is of special interest in this country today, as the same practice can also be applied to natural gas, which is mainly composed of methane.

For the usual mixture of acetylene with oxygen in the proportion of 1:1, as originally used for flame hardening, it was found that based on one cu. ft. of oxygen the acetylene could be replaced by 1.7 to 1.8 cu. ft. of manufactured gas. Under such conditions a saving of 80 to 90% in the gas cost could be achieved.

These economical advantages were not the only ones. The new torches and tips developed by Peddinghaus for this purpose showed a remarkable safety in operation. The gas taken from the city line simplified the fuel supply. No obnoxious gases from incomplete combustion need be reckoned with.

The Peddinghaus method was quickly adopted by many different industries in Germany and could not be dislodged even when later on it was proved that by using an excess of oxygen with acetylene the acetylene cost could be reduced.

Originally on flame hardening machines only tips with slots were used in connection with the manufactured gas-oxygen flame. As the slotted tips have a limited gas capacity a so-called Pueschel burner was developed which achieved thin case and greatly increased rates of feed.

The recent development of a lamellated tip allows feed rates up to 24 inches per minute. The increased feed rate is, of course, bought at the expense of economy in gas consumption. It is therefore necessary to decide in each particular case what kind of tip is to be used, depending on the fuel costs and wages involved, in order to hit an economical optimum. All three types of tips are now in use in Germany.

Aside from the selection of the proper steel the results of flame hardening depend on the maintenance of the correct quenching temperatures required by the material used. Peddinghaus, at an early stage, recognized the importance of this fact and developed a pyrometer which permits the reading of the hardening temperatures without contact or time lag on very small surfaces. This "Milliskop," as it is called, reads the difference in temperature between the work piece and the required temperature which has been established beforehand. It is not influenced by outside interferences, especially light, and has a wide temperature range. It will read the true temperature whether the surface on which it is focused be in complete darkness or in sunlight. With the "Milliskop" progressive hardening of cylindrical or flat surfaces can be automatically controlled. It has proved its worth in mass production and in hardening large expensive parts. Reports from the field unanimously agree that the uniformity of hardening is greatly improved by the use of the "Milliskop." No longer need a flame harden-

**Translated by Dr. M. E. Bolin.*

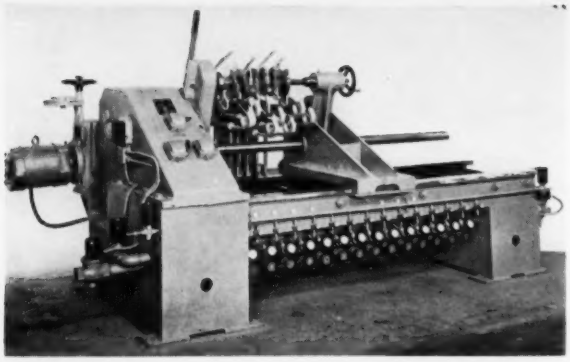


Fig. 1—Crankshaft Hardening Machine developed for use of city gas-oxygen heating fuel.

ing operation be entirely dependent upon the experience and skill of the operator.

The German automotive industry was the first to adopt this new equipment. The majority of German automobiles use parts hardened on Peddinghaus machines such as: crankshafts, camshafts, steering knuckles, brake levers, rear axles, tappets, spring bolts, hubs, rocker arms, ball joints, coupling flanges, journals, shifting forks, etc.

For the mass production of crankshafts a special machine has been developed (Fig. 1). The crankshaft rotates around its normal axis, as the torches and sprays assigned to the crank journals follow the movement of the cranks so that the hardening of a four-cylinder crankshaft can be finished in six to eight minutes. From three to five journals are simultaneously hardened, since the torches and sprays are controlled by solenoid valves. The valves to be actuated are connected on a selecting switch beforehand and when the crankshaft is swung by a lever into the reach of the flame the selected torches are ignited. When the proper temperature is reached the crankshaft is swung under the spray. The time required for quenching is controlled by a time relay and interrupted when the journal reaches a temperature of 250 to 300°F. Later on the other group of journals is hardened in the same manner. As the torches and sprays follow the motion of the crank journals it is not necessary to change the center of rotation when treating the crank journals.

Camshafts are also hardened on similar machines. (Fig. 2.)

Wrist pins, steering bolts, spring bolts, ball joints and similar parts are usually used in such quantities that they justify the use of automatic machines. Hardening machines for these purposes are built in two sizes (Fig. 3). The smaller one for bolts up to 1 in. dia. and 10 in. long, the larger one for bolts up to 2½ in. dia. and 16 in. long.

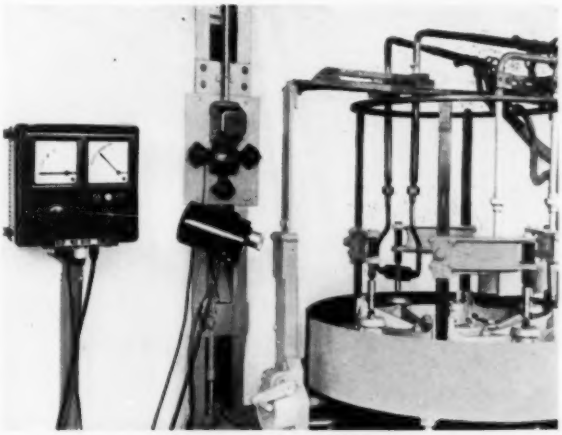


Fig. 3—Automatic Bolt Hardening Machine. "Milliskop" controls are seen left.

Fig. 2—A similar Camshaft Hardening Machine.

At the present time tests are in progress for hardening railroad wheel tires by hardening the flanges only (Fig. 4). The results so far indicate that the life of a tire can be increased very considerably by this method.

Burner tips for natural gas or manufactured gas can be built for very large capacities and are, due to the slow flame velocity of these gases, perfectly safe. This opens up the possibility for two interesting applications: namely, the hardening of armor plate and of calender rolls.

By suitable treatment it was possible to harden plates 3 x 19 feet and 1¼ inch thick practically without distortion (Fig. 5). As compared with case hardening the savings were considerable, as well in cost for the installation as in time saved. Where it took 250 hours to harden a certain amount by case hardening, it took only three hours by the flame hardening method. Plates ¾ in. to 6 in. thick could be hardened to a case of 10% of the thickness. Thinner plates could be hardened when cold, while the thicker ones had to be preheated. The case of the plates treated that way is very homogeneous and has excellent shellproof qualities.

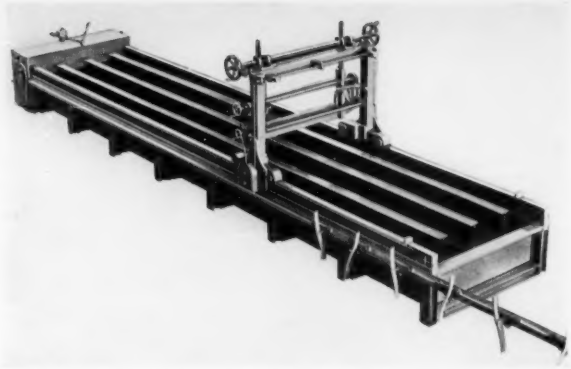


Fig. 5—Machine for hardening armor plate. On this equipment plates up to 6" thickness could be hardened to a depth of case of 10% of the thickness.

Flame hardened calender rolls have replaced chilled iron castings with good success in the food, paper and textile industries, especially since the use of steel alloys with good hardening qualities.

Standard machines for hardening rolls up to 18 in. dia. by the progressive spinning method are available.

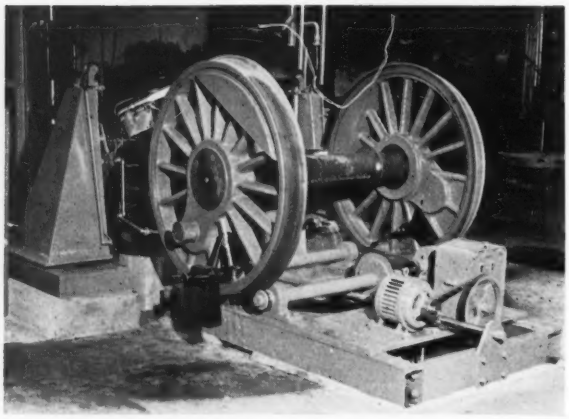


Fig. 4—Special machine for hardening wheel tires.

Burner tips however have been supplied for rolls of 40 in. diameter and larger.

The bevel gears used in rolling mills in Germany are probably all flame hardened (Fig. 6) today. Some steel mills are equipped with the necessary machinery and the rest have the hardening done in commercial shops. Such hardened gears have a life four to five times longer than untreated gears.

During the war the replacement of bronze bearings by sintered iron bearings required the flame hardening of rolling mill journals. Nowadays most rolling mills have hardened journals running in flame hardened steel bearings. Operating reports show a five to thirteen times longer life for this combination than for soft journals in bronze bearings.

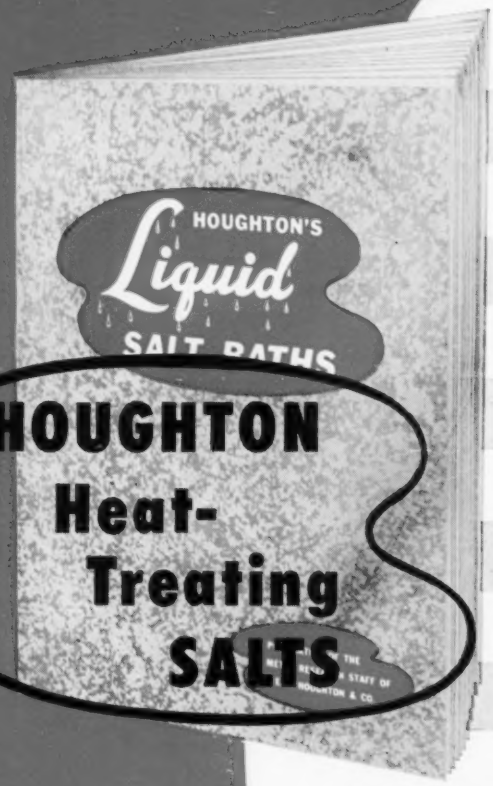
Flame hardening of machine tool beds is widely accepted today. Machines built for that purpose are also available.

All the machines can of course also be used with oxy-acetylene flame. Torches and tips for natural gas are also available.

It appears from the examples related and the type of equipment, attachments, and accessories available, that in some instances both the commercial heat treating plant and the industrial departments could profit substantially by the adoption of these devices.

Fig. 6—Hardening of bevel gears using a city gas-acetylene burner.

Metalworking's most Complete Source for all Heat-Treating needs!



HOUGHTON Heat-Treating SALTS

- CARBURIZING
- NEUTRAL HARDENING
- REHEATING
- ANNEALING
- BRAZING
- HIGH-SPEED HEATING
- TEMPERING
- MARTEMPERING
- AUSTEMPERING
- QUENCHING

For heat-treatment of ALUMINUM parts use DRAW-TEMP 430

This pure, doubly refined salt is widely used today because it is exceptionally safe in heat treating aluminum alloys—such as used in aircraft parts. It meets the requirements of MIL-S-10699, Class 2. Draw-Temp 430 has a melting point of 430° F.—a working range of 550° to 1000° F. Aluminum heat-treatment is accomplished in one-third less time than in atmosphere furnaces. If you're treating aluminum parts you'll want Draw-Temp 430.

HOUGHTON LIQUID SALTS have been developed to meet all of your heat-treating applications

Our complete line offers you pure, stable, cost-saving salts specially prepared to meet your specific needs. Houghton's research staff worked closely with the metalworking industry to produce liquid salts that give you fast, uniform heating—freedom from scale—greatly reduced cracking and distortion of the work—and at low production costs.

Our 32-page booklet, "Houghton's Liquid Salt Baths," covers the complete line, along with helpful heat-treating information. Ask the Houghton Man for a copy or write to E. F. Houghton & Co., Philadelphia 33, Pa.

... products of

E. F. HOUGHTON & CO.

PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service ...

Institute News . . .

FLASH!

Just as we go to press it has been settled by your Committee that the Annual Spring Meeting of the Metal Treating Institute will be held May 21-23 at the Lake Placid Club, Lake Placid, N. Y. Facilities have been inspected and are of an unusually high order.

Mark these dates on your calendar now.

Complete details as to the program and other events will be published in the next issue of METAL TREATING.

PROFIT SHARING FOR BETTER BUSINESS

At several meetings, MTI members have discussed profit sharing. Quite a few have a system in operation in their plants. There are many different forms in existence in America today. All have in common the sharing of Company earnings with employees as an incentive to better production.

Three members of MTI, Commercial Steel Treating of Detroit, J. W. Rex Company of Lansdale, and Metlab Company of Philadelphia are members of the Council of Profit Sharing Industries, whose fourth annual conference was held in Detroit, November 12, 1951. Luke Miel, Walter Rex, and Horace Knerr of those Companies took an active part in the meetings. They came away more than ever convinced that the profit sharing idea is the coming thing in American Industry, and is particularly well adapted to Commercial Heat Treating concerns because of the exacting nature of our work, the skill and intelligence required of our employees, and the importance of whole-hearted cooperation from top to bottom of the organization.

Ralph J. Hoensheid, founder of Commercial Steel Treating Co., Detroit (a member of MTI) was one of the leaders in the establishment of a successful Profit Sharing Plan in the Commercial Heat Treating Industry.

Believing that many MTI members will have an increasing interest in this remarkable movement, and that the philosophy, though not the methods, of Profit Sharing are most eloquently expressed in the opening remarks of Mr. William Loeb, Chairman of C.P.S.I., the following abstract of his speech is presented to our readers:

The Council was started with 60 profit sharing concerns who met in Cleveland four years ago. Today it numbers over 425 concerns. It is an aggregation of men having a rare combination of good will and ability. The success of the Profit Sharing idea is most forcibly illustrated by the success of those companies which intelligently practice it. The greatest thing about Profit Sharing is that *it works.*

There is more to Profit Sharing than the success of the individual company. Undoubtedly, it is tied in closely with the future of America and our system of free, competitive enterprise. Today, the forces of those who believe in freedom, whether they be worker or owner, all over the world, are desperately embattled with either the bloody Marxism we know as Russian Communism, or the politer type of Marxism which we know as British Socialism. You cannot defeat Socialism with nothing. You must present the people with an attractive alternative. Not withstanding the recent election of Winston Churchill, more Englishmen voted for Socialism than ever before in the history of England. Australia, which is supposed to have thrown out Socialism, has a government as socialistic today as it was under the Labor Government.

Socialism is a strictly non-partisan disease. It can infect any political party. Taxes in this country are going up and up. There is no reason why they won't continue to do so until, in a very polite but completely efficient manner, private business is strangled. That will happen most assuredly unless we, who believe in freedom, find some definite way of appealing to the great masses of voters in this Country. Unless all of those who value freedom as against Socialism have something on which they can unite and believe, we will have the ultimate extinction of private industry in this Country. The remedy, Profit Sharing, is straightforward and sure. It fits completely into the traditional pattern of American life.

Socialism is a hangover of the European class struggle, which most of our ancestors came across the seas to avoid. It is a system by which the few control the many. Profit Sharing, in contrast, is a system by which the contributions of each individual are tremendously important, thus increasing the dignity of the individual and strengthening the whole. It is the truly American way of doing things. Its emphasis is on the creation of new wealth, in line with the American pioneering tradition and on the sharing of an ever larger and more successful future.

The idea behind Socialism is that of dividing the existing pie, instead of creating more pie. This idea is completely un-American.

The idea of Profit Sharing will not sell itself. A very great obligation rests on all of us to continually spread its doctrine. This requires some courage and daring on the part of American management. The workers and the general public are ready to be sold. They want something different from class hatreds, jealousies and continual bickering. The people, today, are ready for an advance away from the dead hand of Socialism and the bloody fist of Communism.

A remarkable fact about the American Revolution is that the men who made the struggle were most unusual revolutionists, because they were most exceedingly prosperous. With the exception of a few such as Sam Adams, most were wealthy. Some, like John Hancock, were the wealthiest men in the colonies. They had the extraordinary vision to realize that they could not simply sit still

(Continued on page 21)

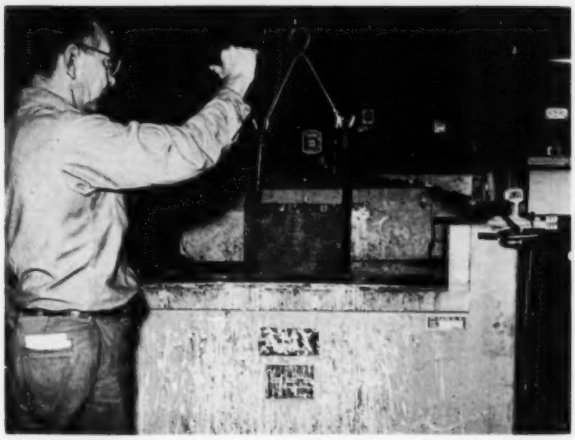


Fig. 3—Salt bath tempering unit. Work basket is being lowered into bath by operator.

tenance of the bath is required to keep it in good operating condition. Our normal practice is to do this at the end of each shift. I will admit that in desludging we are quite liberal in our removal of molten salt with the sludge such that we add some 25 to 35 pounds of fresh salt daily, a replacement of approximately 4 to 5% of the salt.

Originally we used a standard power spray washer for removing the salt from the tools. To the heated water we added a multitude of detergents to try and speed up the cleaning action. None proved satisfactory, so some three years ago we rebuilt the spray unit, tripling the pressure at the nozzles and changing the water more often. The improvement in cleaning was marked and to date we have not found a better method of removing the quench salt.

Fig. 4—A representative lot of tools hardened during day in our 4-bath high speed steel hardening unit.

DEVINE AGITATORS

ASSURE

UNIFORM QUENCHING TEMPERATURES

- Provide proper circulation of quenching liquid.
- Help equalize quenching strains.
- Compact. Self-contained. No piping required.
- Unusually sturdy. Built for plenty of use.
- Easy to install. Easy to detach. Easy to maintain.

Devine Engineers will be glad to recommend a type and size to fit your tank.

J. P. DEVINE MFG. CO.

A. M. Cox, President

49th St. and AVRR · Pittsburgh 1, Pa.

Devine AGITATORS

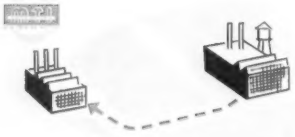
BEFORE-

BUYING NEW EQUIPMENT OR EXPANDING PRESENT FACILITIES CONSULT A...

MTI MASTER CRAFTSMEN METAL TREATING INSTITUTE

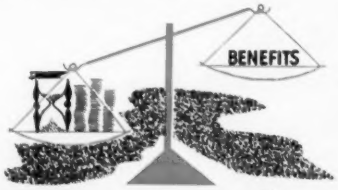
COMMERCIAL HEAT TREATER

If you are faced with the sudden need to produce prime or sub-contract work for the Rearmament Program which requires heat treatment, before establishing a new department or expanding your present facilities, check with a MTI commercial heat treater. There are a number of reasons for this.



First of all, it is likely that there is a commercial plant located near you that will not only have the facilities and equipment, but the skill and experience to perform the heat treating operations required, whatever they may be.

Secondly, the establishment of a new department or the expansion of your present one would require an inordinate amount of time and investment; — out of proportion to the benefits which might result.



Thirdly, the new plant or department or equipment will, when the need for it no longer exists, only stand idle or be scrapped. This was proved painfully in the recent post-war years.

Finally, even if only government money is involved, remember this is *your* money and the economical handling of it will be to your benefit.

If you are faced with heat treating problems or the need for heat treating services, write

METAL TREATING INSTITUTE 271 NORTH AVENUE NEW ROCHELLE, N. Y.

or consult the MTI members listed on the following page.

You can always add a MTI Commercial Heat Treating Plant to your Facilities:

CALIFORNIA

California-Doran Heat Treating Co.
2850 E. Washington Blvd., Los Angeles 23
Cook Heat Treating Corp.
5934 Alcoa Ave., Los Angeles 11
Hollywood Heat Treating Co.
1046 No. Orange Drive, Los Angeles 38
Lindberg Steel Treating Co.
3537 East 16th St., Los Angeles 23
Dexter Metal Treating Co.
1026–77th Ave., Oakland 21
Industrial Steel Treating Co.
600 Fallon St., Oakland 7

COLORADO

Metal Treating & Research Co.
651 Sherman St., Denver 3

CONNECTICUT

Commercial Metal Treating, Inc.
89 Island Brook Ave., Bridgeport 6
Stanley P. Rockwell Co.
296 Homestead Ave., Hartford 5

ILLINOIS

Senecca Heat Treating Co.
70 S. Batavia Ave., Batavia
Accurate Steel Treating Co.
2226 W. Hubbard St., Chicago 12
Chicago Steel Treating Co.
333 North California, Chicago
Dura-Hard Steel Treating Co.
2333 West Deming Place, Chicago 47
Lindberg Steel Treating Co.
222 North Laflin St., Chicago 7
Pearson Industrial Steel Treating
5757 Ogden Ave., Chicago 50
Perfection Tool & Metal Heat Treating Co.
1740 West Hubbard St., Chicago 22
Fred A. Snow Co.
1942 West Kenzie St., Chicago 22
American Steel Treating Co.
P. O. Box A, Crystal Lake
Eklund Metal Treating, Inc.
721 Beacon St., Love Park
O. T. Muehlemeyer Heat Treating Co.
1531 Preston St., Rockford
C. U. Scott & Son, Inc.
1510 First Ave., Rock Island

INDIANA

Nerl Heat Treat Corp.
1824 So. Franklin St., South Bend 23

MARYLAND

Maryland Tool Company
111-13 Hollingsworth St., Baltimore 2

MASSACHUSETTS

New England Metallurgical Corp.
9 Alger St., South Boston 27
Porter Forge & Furnace, Inc.
74 Foley St., Somerville 43
Greenman Steel Treating Co.
284 Grove St., Worcester 5

MICHIGAN

Anderson Steel Treating Co.
1337 Maple St., Detroit 7
Bosworth Steel Treating Co.
18174 West Chicago Blvd., Detroit 28
Commercial Steel Treating Corp.
6100 Tireman Ave., Detroit 4
Commonwealth Industries, Inc.
5922 Commonwealth Ave., Detroit 8
Michigan Steel Processing Co.
3120 Denton, Detroit 11
Standard Steel Treating Co.
3468 Lovett Avenue, Detroit 10
Vincent Steel Process Co.
2424 Bellevue Ave., Detroit

MINNESOTA

Metallurgical Control Labs.
2226 East Lake St., Minneapolis 7

MISSOURI

Lindberg Steel Treating Co.
650 East Taylor Ave., St. Louis 15
Paulo Products Co.
5711 West Park Ave., St. Louis 10

NEW JERSEY

Ace Heat Treating Co.
611 Grove St., Elizabeth
American Metal Treatment Co.
Highway 25 and LaFayette St., Elizabeth
Benedict-Miller, Inc.
Marin Ave. and Orient Way, Lyndhurst
Bennett Steel Treating Co.
246 Raymond Boulevard, Newark 5
L-R Heat Treating Co.
107 Vesey St., Newark

NEW YORK

Fred Heinzelman & Sons
138 Spring St., New York 12
Alfred Heller Heat Treating Co.
391 Pearl St., New York 7
Metro Heat Treat Corp.
466 Broome St., New York 13
Lindberg Steel Treating Co.
620 Buffalo Road, Rochester 11
Syracuse Heat Treating Corp.
1223 Burnet Ave., Syracuse 3

OHIO

Cincinnati Steel Treating Co.
Wooster Pike & Mariemont Ave.,
Cincinnati 27
Queen City Steel Treating Co.
2980 Spring Grove Ave., Cincinnati 25
Ferrotherm Co.
1861 E. 65th St., Cleveland 3
Lakeside Steel Improvement Co.
5418 Lakeside Ave., Cleveland 14
George H. Porter Steel Treating Co.
1265-71 East 55th St., Cleveland 14
Winton Heat Treating Co.
20003 West Lake Road, Cleveland 16
Dayton Forge & Heat Treating Co.
2323 East First St., Dayton 3
Ohio Heat Treating Co.
1100 East Third St., Dayton 2

PENNSYLVANIA

Robert Wooler
Limekiln Pike, Dresher
J. W. Rex Co.
834 West Third St., Lansdale
The Drever Company
220 West Cambria St., Philadelphia 33
Lorenz & Son
1351 N. Front St., Philadelphia 22
Metlab Company
1000 East Mermaid Lane, Philadelphia 18
Wiedemann Machine Co.
4272 Wissahickson Ave., Philadelphia 32
Ferrotherm Company
4911 Butler St., Pittsburgh
Pittsburgh Commercial Heat Treating Co.
49th St. and A.V.R.R., Pittsburgh 1

TEXAS

Cook Heat Treating Co., of Texas
6233 Navigation Boulevard, Houston 11

WISCONSIN

Wesley Heat Treating Co.
825 South 21st St., Manitowoc
Hushek Metal Processing Co.
1536 West Pierce St., Milwaukee
Metal Treating, Inc.
720 South 16th St., Milwaukee 4
Supreme Metal Treating Co.
4440 West Mitchell St., Milwaukee 14
Thurner Heat Treating Co.
809 West National Ave., Milwaukee 4
Wesley Steel Treating Co.
1301-1403 West Pierce St., Milwaukee
Harris Metals Treating Co.
1745 Taylor Ave., Racine
Spindler Metal Processing Co.
2338 Mead St., Racine
Wesley Metal Treating Co.
2320 Mead St., Racine

THERMO-COUPLETTES . . .

New Line of Resistance Thermometers

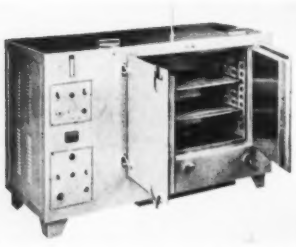
A new line of resistance thermometers designed for accurate indication and control of temperatures ranging from minus 100 F to plus 300 F has been announced by the General Electric Company's Meter and Instrument Department.

The new instruments, applicable in a wide variety of industrial processes, are available in three basic types: the HP-11 resistance-thermometer indicator; the HP-13 two-position controller or protector; and the HP-14 three-position controller. Each type is designed for either flush or surface mounting.

All the thermometers use the same basic mechanism, a crossed-coil moving element and a high-strength 3¼-pound alnico V magnet, designed for hard usage and reliable operation. The entire mechanism is enclosed in a dust-tight, moisture-resistant case-and-cover assembly that permits its use in moist or contaminated atmospheres.

The thermometers are being used on quenching tanks and ovens of various types.

Blue "M" Con-Wate Mechanical Convection Ovens*



With the objective of providing improved heat uniformity throughout and improved heat transfer between heater bank and load in the oven, Blue "M" Electric Co., Chicago 21, Ill., has developed the new Con-Wate mechanical convection oven.

This Con-Wate oven is said to provide a constant air weight circulation at all temperatures by the setting of a quadrant which allows definite quantitative control of the constant air weight circulation which, in turn, controls velocity to any desired value. By the mere shifting of the Con-Wate control quadrant, the velocity is readily adjusted to any desired value from 50 to 250 F.P.M. equivalent.

Another feature is the Visi-Float, which at all times, shows the condition of air circulation in the heated chamber. Thus guessing is eliminated.

Objectionable radiant heat is a thing of the past because directly above the Modella heater tank is a double wall insulated stainless steel panel.

The new three point suspension motor to blower direct—drive eliminates belts, pulleys and countershafting.

To provide maximum safety the Con-Wate oven may be equipped at any time with the Blue "M" low cost "Packaged Protection" control panel by simply removing an auxiliary panel.

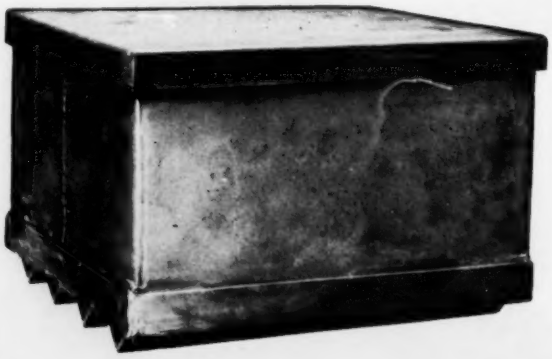
Temperature range 35°C to 288°C; interior is of 18-8 stainless steel, exterior of heavy gauge steel finished in gray enamel. Two adjustable stainless steel shelves. Double wall door, fitted with chrome plated hardware, has the Blue "M" exclusive bellows-type leak proof seal. Three sizes available.

Improved Stanwood Carburizing Box Features V-Skid

The Stanwood Corporation, Chicago 39, Illinois, has incorporated V-type supporting skids for a popular type carburizing box. Users who have already tried these improved boxes on numerous applications report substantially better support for heavy loads under high temperature use. The new construction has also resulted in improved air circulation over the bottom of the box.

The sides of these Stanwood Carburizing Boxes are rolled plate for extra strength, less weight, and more space for parts. Expansion and contraction, resulting from fluctuating temperatures, is uniform from top to bottom and adds many hours of service to the life of the boxes. An additional strength factor is achieved through the use of rounded rather than welded corners. All necessary welding is gas tight.

One-piece combination cast bottoms and legs are available for extra-heavy loading. Sizes are available for many applications.



Pat. Pending

Contro-Therm Quench Tank

A new type quench tank of the constant level, re-circulating type is being introduced by A. D. Alpine, Inc., of 11837 Teale Street, Culver City, California.

Designed to receive work from a mechanical loader which removes the entire load from the furnace and quenches it in one easy operation, this Contro-Therm quench tank cools as it circulates the quenching liquid. Moreover, an airflow circulator can be added to make it usable with more than one furnace.

In addition to the main quench tank, this single piece of equipment includes a reserve and cooling tank, pump, and motor. Legs of this quench tank are high enough to allow a loader to slip under it so that the load can be deposited mechanically in the quenching liquid.

The tank maintains a constant level regardless of the displacement caused by treated work. As the load is lowered into the tank, the overflow runs over a low dividing wall into the reserve section of the tank. In this section is a heavy duty pump which constantly circulates the quenching medium back into the main part of the tank, aerating and cooling the liquid to insure a uniform quench. Directional flow can be changed at will.

Overall dimensions of the Alpine quench tank are: Width, 30 inches; length, 42 inches; depth 30 inches. Pump motor is ¼ H.P. 110 volt, single phase.

Wet Blast Chemicals

A complete line of abrasives for wet blasting machines is available directly from stock, according to an announcement made by American Wheelabrator & Equipment Corporation, Mishawaka, Indiana. Sizes supplied range from 80 to 2500 mesh, and they are packaged in convenient 50-lb. weights for easy charging of the machine and storage simplification. They are shipped in sturdy corrugated cartons which withstand rough handling. American Wheelabrator is also prepared to provide from stock all of the other chemicals needed for wet blasting. Anarust, the company's rust inhibitor, embodies two characteristics new to inhibitors: Being in liquid form it goes in solution immediately and it virtually eliminates the staining normally expected with inhibited water. Anaset, an anti-packing chemical, completes the company's line of wet blasting supplies.

Radiation Pyrometer

Pyro Radiation Pyrometers offer a quick and accurate method for the measurement of temperatures above 1,000°F. by thermo-electrical principles. This unit is completely self-contained, weighs less than two pounds, is direct reading and has no outside connections, lead wires or other accessories. Pyro Radiations are completely automatic and do not require any skill in their use. The instrument is simply sighted on the heated body or furnace and the temperature read directly on the scale.

True temperature readings are secured with this instrument when ideal "black body" conditions are observed. For other than "black body" conditions, relative temperatures are obtained and the Pyro Optical is recommended since the latter instrument is not dependent upon these conditions.

Pyro Radiation Pyrometers, manufactured by The Pyrometer Instrument Co., N. Y. City, are furnished complete with hardwood carrying case and heavy leather straps for instrument and case in the following ranges:

Double Range Model No. 1:
1,000°-1,800°F. and 1,800°-2,600°F.
Double Range Model No. 2:
1,400°-2,400°F. and 2,400°-3,600°F.

Box Type Heat Treating Furnace

A technician removes dental forgings from a General Electric box-type furnace at the S. S. White Dental Manufacturing Company, Philadelphia, the world's largest manufacturer of dental tools.

Use of this furnace and another similar to it has resulted in faster production, fewer rejected pieces, and more uniform hardness of the tools, according to White Company engineers.

The 220-volt model shown has a temperature rating of 1850 F and a capacity of 200 forgings a day of both carbon and stainless steel. The forgings are heated

(Continued on next page)

for eight hours and then allowed to cool overnight before being removed.

"Electric heat," say the firm's engineers, "is more satisfactory than previous methods used in our processing because it is more constant—has less than 15 per cent variation. In addition, the forgings are more uniform in hardness, facilitating machining and bending, and this results in fewer rejected pieces and faster production. The pieces average 85 to 90 Rockwell B, a high standard."

Angle Head Centrifuge

A new, low-priced Angle Head Centrifuge is being introduced by the Scientific Glass Apparatus Co. Inc., of Bloomfield, New Jersey. It is particularly recommended for those applications where fast individual tests are required.

To protect the operator, and to prolong the life and usefulness of the unit, all rotating parts are concealed – including the vital parts of the machine itself. This is accomplished by means of an aluminum guard with a convenient opening at the top, fastened by screws to the base. Three large rubber suction feet are provided for additional safety and smooth operation.

The perfectly balanced angle-type rotor is held on the sturdy shaft by a pin and setscrew. It has four openings to receive the four standard type 15-ml metal shields supplied with each centrifuge. Four 15-ml size glass tubes are also provided.

The centrifuge is controlled by a convenient "on" and "off" switch located in the base. It is powered by an AC motor of 115 volts, 60 cycles, drawing 1.5 amps., which operates at 1550 rpm. The motor is well secured to a cast-iron base – well ventilated for continuous operation.

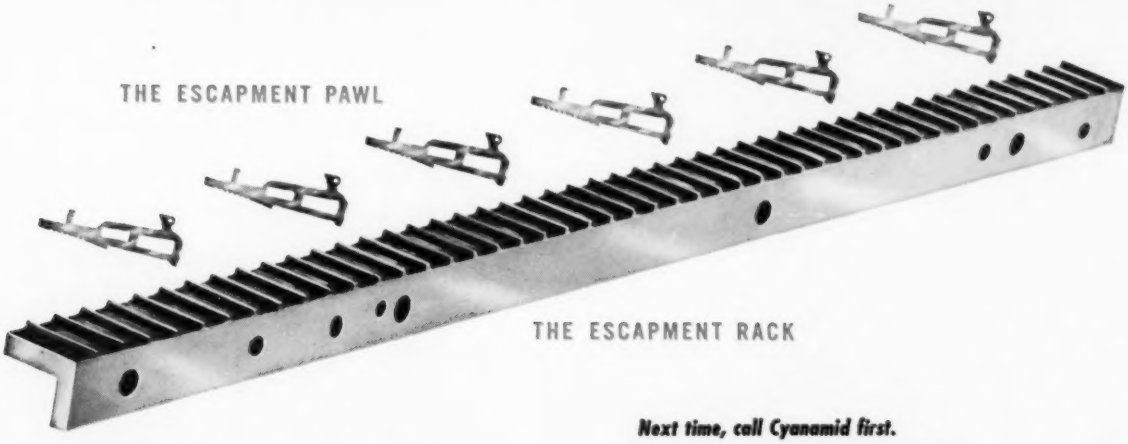
The outside diameter of the centrifuge is 9¾" at the base. The height is 8½". Shipping weight is 18 lbs. Each machine is packed individually in a sturdy carton for convenient shipping.

How IBM saves heat treating dollars using AEROCARB® E&W Carburizing Compounds on Executive Model electric typewriter parts

Here are two examples typical of the way International Business Machines Corp. saves money at its Endicott and Poughkeepsie plants by using Aerocarb E&W.

Treatment: Made of AISI 1035 steel, the pawl is carburized in AEROCARB E&W for about a half hour at 1550°F to a case depth of .006—.008", then oil quenched and tempered to a hardness of Rockwell 52-55 C.

Advantages: Desired wear resistance and impact resistance obtained. An extremely important factor is minimum distortion—pawls are held flat within .002", and parallel within .001". Parts are also easily washed.



Treatment: Made of AISI 4615 steel, the rack is carburized in AEROCARB E&W at 1650°F for one hour to produce a case depth of .015—.017". It is then air cooled and the solidified salt removed by a hot water rinse. Next, the teeth *only* of the rack are hardened by *high frequency induction* heating followed by a water quench. Tempering completes treatment and teeth must meet a Rockwell hardness specification of 80-82 A.

Advantages: Use of Aerocarb E&W gives easy washing, aids in obtaining exactly the desired case composition and minimizes distortion (tolerances: length ± .002"; flat within .003").

For effective, money saving results, let Cyanamid technical service and heat treating compounds team up to help you meet rigid specifications required on defense and civilian contracts.

Next time, call Cyanamid first.

Cyanamid's heat treating compounds include:
AEROCARB® Carburizing Compounds
AEROCASE® Case Hardening Compounds
AEROHEAT® Heat Treating Compounds

JMT2

AMERICAN Cyanamid COMPANY

INDUSTRIAL CHEMICALS DIVISION
30 Rockefeller Plaza, New York 20, New York

☐ Send technical data sheet on AEROCARB E&W

☐ Have technical service representative call.

Name_____ Position_____

Company_____

Address_____

City_____ State_____

District Offices: Boston • Philadelphia • Baltimore • Charlotte • Cleveland • Chicago
Kalamazoo • St. Louis • Los Angeles
In Canada: North American Cyanamid Limited, Toronto and Montreal

News to Heat Treaters...

Ohio Crankshaft Announces Expansion

A modern plant covering approximately two acres is under way for Ohio Crankshaft's rapidly expanding Tocco Division, Cleveland. The site is on the west side of 71st Street near Grant Avenue. The new building, 300 feet north and south by 240 feet east and west, was designed by Wilbur Watson Associates, and will be built by The Sam D. Emerson Company. Present plans are for occupancy not later than June 1, 1952.

William C. Dunn, Ohio Crankshaft's president, explained that the purpose of the new plant is two-fold – first to consolidate and increase the facilities of the company's Tocco Division which manufactures high-frequency heat-treating equipment for industry; second to permit expansion of the company's crankshaft and camshaft division into present plant areas now occupied by Tocco.

The new Tocco building will house the largest induction heating laboratories in the world. Part of the experimental space is to enlarge development work on current projects and the remainder will be used to develop completely new applications of a "military nature" which are still in the drawing board phase.

Tinkham Veale II, assistant to the president, and in direct charge of the expansion project, stated that the building and moving plans would in no way interfere with the Company's heavy production schedules.

* * * *

Lindberg Engineering Company, Chicago 12, Illinois, announces the establishment of an Atlanta office for Georgia, Mississippi, Alabama, and Florida under District Sales and Service Manager, Mr. Philip J. Duffy located at 2828 Piedmont Road, N.E., Atlanta, Georgia.

Mr. Duffy has been a member of the Lindberg organization for twelve years in the engineering, service, and sales departments.

* * * *

Mr. Karl H. Huppert, President of the K. H. Huppert Co., Chicago, Illinois, manufacturers of electric furnaces and ovens, announced the election of Benjamin Sampson, Sales Manager, as Vice President of the Corporation. Mr. Sampson will continue to supervise the Sales of the Company as well as co-ordinate Sales, Engineering and Manufacturing.

* * * *

Dr. John H. Hollomon, 822 Riverside Avenue, Scotia, has been named manager of the Metallurgy Research Department of the General Electric Research Laboratory, Schenectady, N. Y., it was announced today by Dr. C. G. Suits, G-E vice president and director of research. He will succeed William E. Ruder, who retired January 1.

A native of Norfolk, Va., Dr. Hollomon received his bachelor's degree from Massachusetts Institute of Technology in 1940 and his Doctor of Science degree from the same school in 1946 for work in metallurgy.

After serving on the faculty of M. I. T. and of Harvard University, he served in the U. S. Army from 1942 to 1946, where he attained the rank of major. While in the Army, he was chief of physical metallurgy at the Watertown Arsenal, Watertown, Mass.

In 1946, Dr. Hollomon joined the G-E Research Laboratory and was later made assistant manager of the Metallurgy Research Department. He has authored and co-authored some 40 papers in physics and metallurgy journals, as well as a book, "Ferrous Metallurgical Design."

His professional awards include the Rossiter W. Raymond award of the American Institute of Mechanical Engineers in 1946, and the Alfred Noble award of the Combined Engineering Societies, 1947, for a paper entitled, "The Mechanical Equation of State."

Write for NEW Price List on Solution Pots

YOU no longer need buy pots by the pound. Now, Fahralloy Solution Pots are unit priced. Get our prices on your requirements before placing your next order. Fahralloy Pots give maximum service life. Made of proved-in-service alloys, under close laboratory control. Patterns for practically all sizes of pots.

•

Cut costs with Fahralloy Pots, Carburizing Boxes, Trays, Fixtures, Furnace Rollers and other "heat-friendly" parts.

THE FAHRALLOY COMPANY

15500 S. Lexington Ave., Harvey, Ill.
Canadian Plant: Orillia, Ontario

Editorial (cont.)

Department of Commerce
National Production Authority
Washington 25

December 7, 1951

Mr. Horace C. Knerr, President
Metallurgical Laboratories, Inc.
1000 E. Mermaid Lane, Chestnut Hill
Philadelphia 18, Pennsylvania

Dear Sir:

This acknowledges your letter of November 27th regarding the open capacity that you have in your plant for commercial heat treating.

We have no control whatever in N.P.A. over the purchasing of new equipment. That is a matter that is settled entirely by the individual companies and in some cases by the military. It appears to me that your only solution is individual initiative. Because of the very long shipments promised on furnaces at the present time you should have little difficulty in convincing the manufacturers in your area that it would be to their advantage to use your services rather than to purchase new equipment.

Yours truly,

/s/ C. L. Ipsen
/t/ Carl L. Ipsen, Chief
Industrial Heating Equipment Section
Metalworking Equipment Division

This exchange of correspondence reveals the continuing existence of two gaps which create the problem and which if they remain unfilled will be costly to the taxpayer, the equipment manufacturer, and the heat treating industry. These are:

1. The government has failed to establish any method for investigating the real need for facility expansion.
2. The heat treating industry, both commercial and industrial* is not doing a thorough job of distributing the facts about the availability of their capacities, equipment and skills.

We are not advocating the establishment of an additional government bureaucracy but do feel that when government financial support is involved, there should be an established procedure of investigation, so as to ascertain whether new or special or expanded facilities are absolutely necessary for handling prime or subcontract rearmament work.

Equally it behooves the entire industry to keep in constant touch with new developments and requirements created by the letting of prime contracts, and see to it that all contractors and sub-contractors are kept fully informed as to open and available capacities. Skilled and experienced heat treaters know the facts about the abilities and flexibility of their equipment which will permit adaptation to special and urgent demands. Proper application of this knowledge can and has saved time, money, equipment and material. Let's concentrate on solving this problem.

**Companies operating heat treating departments with available facilities.*

Tempilstik®

the amazing Crayons that tell temperatures

A simple method of controlling working temperatures in:

- WELDING
- FLAME-CUTTING
- TEMPERING
- FORGING
- CASTING
- MOLDING
- DRAWING
- STRAIGHTENING
- HEAT-TREATING IN GENERAL

It's this simple: Select the Tempilstik® for the working temperature you want. Mark your workpiece with it. When the Tempilstik® mark melts, the specified temperature has been reached.

$2 each

gives up to 2000 readings

Available in these temperatures (°F)

113	263	400	950	1500
125	275	450	1000	1550
138	288	500	1050	1600
150	300	550	1100	1650
163	313	600	1150	1700
175	325	650	1200	1750
188	338	700	1250	1800
200	350	750	1300	1850
213	363	800	1350	1900
225	375	850	1400	1950
238	388	900	1450	2000

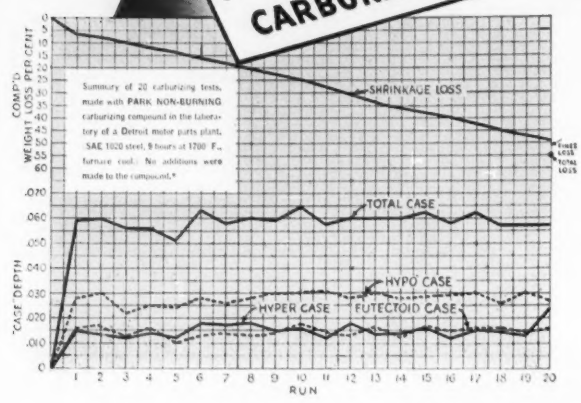
Also available in pellet or liquid form.

FREE —Tempil® "Basic Guide to Ferrous Metallurgy" — 16¼" by 21" plastic-laminated wall chart in color. Send for sample pellets, stating temperature of interest to you.

METAL & THERMIT CORPORATION

100 EAST 42nd STREET
NEW YORK 17, N. Y.

TESTS PROVE LOW SHRINKAGE OF... Park NON-BURNING CARBURIZERS


COMP'D WEIGHT LOSS PER CENT
Summary of 20 carburizing tests, made with PARK NON-BURNING carburizing compound in the laboratory of a Detroit motor parts plant. SAE 1020 steel, 9 hours at 1700 F., furnace cool. No additions were made to the compound.*
SHRINKAGE LOSS
FIRES LOSS
TOTAL LOSS
CASE DEPTH
TOTAL CASE
HYPO CASE
HYPER CASE
EUTECTOID CASE
RUN

YOU CAN CUT your consumption of carburizing compound up to 50% by using PARK NON-BURNING pack-curburizers. Shrinkage losses are low and carburizing activity is maintained by additions of as low as 1 to 16. Moreover, these materials are ideal for direct quenching because they do not burn after removal from the furnace.

CASE DEPTHS furnished by PARK NON-BURNING carburizing compounds are consistent with steels' ability to absorb carbon during any given time-temperature cycle. In addition, undesirable carbon build up at steel surfaces is prevented, particularly on alloy steels. Surface carbon concentrations rarely exceed 1% with conventional carburizing temperatures.

THE ENERGIZING CHEMICALS in PARK NON-BURNING carburizers are evenly distributed throughout the granules. The compound retains its carburizing potential indefinitely and is not damaged by handling. Its weight per cubic foot is considerably less than smeared coke type materials.

The smaller sizes of PARK NON-BURNING carburizing compounds are ideal for packing small parts and a special grade prevents copper migration on copper plated parts.

USE PARK "NO-CARB"

...if you want to carburize selectively in either pack or gas carburizers . . . or prevent decarburization on high alloy steels during heating for hardening. Bulletin on request.

Park CHEMICAL COMPANY
8076 MILITARY AVE.
DETROIT 4, MICH.

Imagination was given to man to compensate him for what he is not. And sense of humor was provided to console him for what he is.

* * * *

A good husband is one who stands by his wife in troubles she wouldn't have had if she hadn't married him.

* * * *

"The best way to solve many of our problems is to work hard," asserts an editor. What's the next best way?

* * * *

Some girls will flirt with every man in town until they hook one. After that they think flirting is a crime.

It Really Happened

EDITOR'S NOTE: *The stories below were submitted to us by a reader with his assurance that they really happened. We will be glad to publish similar stories provided by other readers. Send us your favorites.*

YOUR TIME IS MY TIME

Captain C. J. Harrah, an early president of the Midvale Steel Company, went to England for the purpose of discussing a possible merger with the Vickers Company, Ltd. He had an appointment in Lord Vickers' office for 10:00 A.M. sharp.

Lord Vickers turned up at 10:30, made no apology for his lateness, and the meeting proceeded.

No conclusion having been reached, it was agreed to meet again the following morning, same time and place. This day, Captain Harrah strolled in precisely at 10:30. Lord Vickers said with indignation, "Captain Harrah, you're late!" Captain Harrah replied, "You were late yesterday." Lord Vickers: "Yes, but I was detained." Captain Harrah: "I wasn't, I just walked up and down the hall." (P.S. — No merger)

ORIENTAL COURTESY

Some years ago Midvale Company received a contract from the Chinese Government for the manufacture of a very large forging requiring the combined product of several open hearth furnaces. When the ingot was poured, a representative of the Chinese Government, a very highly educated Doctor of Science, visited the Midvale plant to witness the operation.

Politely, he spoke to the Melter, named Callahan, complimenting him on his fine work and adding, "If this turns out as well as we expect, we probably will order more from you."

The Irishman replied, "I'm thinking you'll have to wash a hell-of-a lot of shirts to pay for this one!"

and be content. They had the daring to try something which the people wanted, and which boded well for the nation as a whole. America's greatness is a blend of the practical and the ideal, which has never yet been matched in the history of the world. The obligation rests on us to see that the onward march of America continues. In the field of economic relationships, Profit Sharing, with its blend of the practical and the ideal, is the answer.

After Mr. Loeb's speech of welcome, several hundred delegates continued with a series of meetings and conferences. Many aspects and methods of the Profit Sharing idea were discussed. Noteworthy were talks by employees, both union and non-union, of the various industries. Without exception, all enthusiastically endorsed the system.

* * * *

SEVEN NEW MEMBERS FOR MTI

It is with real pleasure that the Metal Treating Institute welcomes to its membership the following companies:

The Drever Company, 220 West Cambria St., Philadelphia, Pa.

Lorenz & Son, 1351 N. Front St., Philadelphia, Pa.

Michigan Steel Processing Co., 3120 Denton, Detroit, Mich.

Ferrotherm Company, 4911 Butler Street, Pittsburgh, Pa.

Bosworth Steel Treating Co., 18174 West Chicago, Detroit, Mich.

Standard Steel Treating Co., 3468 Lovett Ave., Detroit, Mich.

Senecca Heat Treating Co., 70 S. Batavia Avenue, Batavia, Ill.

All are commercial heat treaters and in keeping with MTI standards are leaders in their field, skilled operators whose activities are making vital contributions to the products of their customers. As members of the Metal Treating Institute they will receive the many benefits which are provided by industrial trade associations in the conduct of their business.

* * * *

The J. W. Rex Company, Lansdale, Pa., has received approval from the Wage Stabilization Board of their Profit Sharing Plans which were inaugurated in December, 1950. These plans include not only a monthly distribution set-up but an annual trust.

President Walter Rex points out that both systems are patterned on plans and practices operating in member Luke Miel's plant, Commercial Steel Treating Corporation, Detroit, and he says "are proving of real value by making everybody happy."

HEAT TREATER—15 years' all-round experience; production set-ups, tools and dies, alloy steels, non-ferrous metals, age 36, desires position. Will locate anywhere if good opportunity. Write Box 52, METAL TREATING, 271 North Avenue, New Rochelle, N. Y.

COMMITTEE APPOINTMENTS

At a recent meeting of the Executive Committee, President Walter Rex appointed the following committees to serve in 1952:

PUBLICATION COMMITTEE

Horace C. Knerr, Metlab Co., *Chairman*
Charles Heilman, Commonwealth Industries, Inc.
Elmer Cox, Pittsburgh Commercial Heat Treating Co.
William Farrar, Cook Heat Treating Corp., L. A.
Robert Derhammer, Lakeside Steel Improvement Co.
Ben Berlien, Industrial Steel Treating Co.
Fred Heinzelman, Jr., Fred Heinzelman & Sons
Clarence Graham, Metal Treating, Inc.
Lloyd Field, Greenman Steel Treating Co.
Clifford Cook, Cook Heat Treating Co. of Texas
George Harris, Harris Metals Treating Co.

HISTORY COMMITTEE

Charles Wesley, Wesley Steel Treating Co., *Chairman*
C. U. Scott, C. U. Scott & Son, Inc.
A. D. Bach, New England Metallurgical Corp.
John Hulting, Perfection Tool & Metal Heat Treating Co.

It has been suggested that a history of the Metal Treating Institute for possible publication in the magazine or for distribution to members and prospective members be prepared. It is hoped that this Committee can send into the Metal Treating Institute offices any records or facts which they have available which would assist in the compilation of a brief historical review of the birth and development of the MTI.

COST ACCOUNTING COMMITTEE

Ray Sault, Porter Forge & Furnace, Inc., *Chairman*
A. D. Bach, New England Metallurgical Corporation
Kenneth Jenks, Lindberg Steel Treating Co.
Henry E. Cooke, Jr., American Steel Treating Co.
E. P. Stenger, Queen City Steel Treating Co.
R. C. Sherwood, California-Doran Heat Treating Co.

HEAT TREATING HINTS COMMITTEE

Fred Heinzelman, Jr., Fred Heinzelman & Sons, *Chairman*
Frank Rizzo, L-R Heat Treating Co.
A. Fulton, J. W. Rex Company
Stewart DePoy, Dayton Forging & Heat Treating Company
Don Edwards, Industrial Steel Treating Co.
Luke Miel, Commercial Steel Treating Corp.
Robert Cox, Pittsburgh Commercial Heat Treating Co.
Joseph Christ, Ferrotherm Co.
Norman Hodgson, Alfred Heller Heat Treating Co.
Victor Bozick, Pearson Industrial Steel Treating Co.
Robert Davis, Perfection Tool & Metal Heating Co.

FOR SALE: Surface Combustion Furnace—gas fired, hearth 42"x60"x 35", 1850°F maximum temperature; Lindberg Rotary Hearth Electric Hydrizing Furnace—type T-48, atmosphere controlled, 48 in. hearth, maximum temperature 2000°F, 55 KW, 220/1/60; Hayes High Speed Tool Hardening Furnace, Brown instrument, 200 C.F.H. GE gas converter, 3 transformers, primary 440V, sec. 220/3/60; Air Compressor—DeVilbiss, 10 H.P. GE motor 220/3/60, 150 lb. pressure.

PEARSON INDUSTRIAL STEEL TREATING CO.
5757 West Ogden Ave., Chicago 50, Ill.

Manufacturers' Literature . . .

The literature listed below contains information of interest to heat treating organizations. For your copy write direct to the manufacturer and be sure you mention seeing it reviewed in "Metal Treating."

New Type Gas Burning Nozzles

The Hauck Manufacturing Co., 124-136 Tenth Street, Brooklyn 15, N. Y., have published Catalog No. 804 B describing their new elbow-type "Retain-A-Flame" gas burner nozzles. The nozzles are said to be particularly adaptable for heat treating furnaces and ovens. New design permits operation of the nozzle with a lower manifold pressure without backfiring.

New Atmosphere Generators

The Hevi Duty Electric Company, Milwaukee 1, Wisconsin, announces a new atmosphere generator Bulletin IND-1147-CR. This bulletin describes the use, construction and specifications of the Hevi Duty "Atmo-Gen" Units.

Heat Treating and Metal Joining

Lepel High Frequency Laboratories, Inc., 55th Street & 37th Ave., Woodside 77, New York City, have just published a new eight-page brochure entitled "Quality, Uniformity, Speed, Economy in Heat Treating and Metal Joining." Well illustrated, the booklet not only describes equipment but illustrates and provides operating details covering definite heat treating jobs including hardening, annealing and stress relieving.

Heat and Corrosion Resistant Fabricated Alloys

Rolock, Incorporated, 1350 Kings Highway, Fairfield, Conn., have a new twenty-page catalog devoted to their line of heat treating accessories and equipment.

Pyrometry

"Notes on Pyrometry," a reprint of an article by the same title, is available from the Tempil Corporation, 132 West 22nd St., New York 11, N. Y. The article is by G. M. Wolten, Director of Research and Development of the Company and provides a concise explanation of the type of pyrometers used in the heat treating industry.

Employees' Insurance Plan

Metlab Co., Philadelphia, Pa., has distributed to its employees an interesting and useful sixteen-page booklet describing the company's Employees' Insurance Plan. Complete details of all benefits and the protection provided the employees are set forth.

Production Straightening

A four-page Bulletin 396 has been published by General Manufacturing Company, Detroit 11, Michigan, describing the newest developments in standard model attachments used in production straightening. The folder also presents complete specifications and dimensions of various models.

Cloth-Type Dust Collectors

American Wheelabrator & Equipment Corporation, Mishawaka, Indiana, has just published a new 36-page catalog, (72-B) "Dust and Fume Control" which describes the various sizes and models of Dustube Collectors (cloth-tube type) and the advantages to be gained from cloth filtration.

Standard assembled and knocked-down models of this equipment have a range of air flow capacities upward from 252 C.F.M. and filter the air through various kinds of cloth — cotton, wool, and synthetics — depending upon the application. Continuous automatic collectors are provided where requirements are such that service must not be interrupted for shaking the filters to release accumulated dust. The description of each type of collector is accompanied by complete specifications, construction drawings, cut-away views, and illustrations of typical installations.

Renegotiation

An eight-page booklet entitled "Renegotiation" has been published by Kenneth G. Smith and Associates, Broad and Chestnut Sts., Philadelphia 7. The booklet sets forth quickly and concisely facts about the Renegotiation Acts of 1951 and basic points to indicate possible procedures for companies subject to Renegotiation (see Page 6, November-December "Metal Treating").

Heat Treating Aircraft Steel

An illustrated, 4-page technical bulletin, "Heat Treatment of Aircraft Steel," to meet U. S. Government Specifications MIL-H-6875, is being offered to the metal industry by E. F. Houghton & Co., Philadelphia, Pa.

This bulletin explains how the maximum hardness and strength of aircraft and other steels can be developed to meet this strict specification through the use of extra high speed quenching oils, such as Houghton's new Houghto-Quench "K", despite the

lean alloy content of much of today's available steels. Charts and tables in this specially prepared bulletin include: recommended temperatures for normalizing, annealing, and hardening certain types of steel, and the quenching medium to be used, in accordance with U. S. A. MIL-H-6875; comparison of hardness depth of steels with low alloy content; hardness penetration of some aircraft steels; Jominy end quench test results; and comparative quenching speeds of various media.

Induction Heating

A new four-page, two-color bulletin describing a new heat-treating machine (G-E Type HM-40-PV) for handling parts to be induction-hardened progressively, has been announced as available from the General Electric Company, Schenectady 5, New York.

The fully illustrated bulletin (GEA-5682) describes the features, applications and specifications of the heat-treating machine which is to be used with either m-g or electronic type induction heaters for hardening or annealing selected areas of parts up to three inches in diameter and 40 inches in length.

"WHEN YOU GETTING YOUR NEW GLASSES, JIMSON?—YOU'RE READING THAT CRACK IN THE WALL AGAIN!"

COURTESY WHEELCO INSTRUMENTS COMPANY

An English critic declares that modern civilization is becoming hardboiled—and here we were thinking it was half-baked!

We know what ought to be done with those millions of overripe eggs the government has in storage: Drop 'em all on the Kremlin.

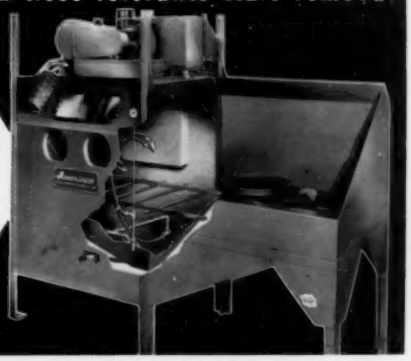
A man isn't supposed to have as much sense as a woman, but a man won't stick the tail of a dead horse in his hat and call it an egret.

Fountain Pen: A writing device that resembles the human head. When nearly empty, it usually spills what little it has inside it.

Personals

Bill Derhammer, of member company, Lakeside Steel Improvement Co., Cleveland, Ohio, sends a news item telling how on December 16 they had a serious fire in their maintenance building. Fortunately, while the loss was great, it was covered by insurance and the fire has not halted defense production.

for simple and improved close tolerance scale removal



LIQUAMATTE *wet blasting...*

Fourteen advanced design features incorporated in the new Liquamatte make removal of light heat treat scale and surface cleaning easier and less costly. Its simplified design overcomes the many operating difficulties often found in wet blasting.

The Liquamatte has an exclusive vertical pump for slurry recirculation and agitation that overcomes packing leakage, shaft wear and plugging troubles. Ample clearance under the machine makes "good housekeeping" easy. Push button controlled — no valves to operate. The lightweight gun is easily maneuverable and throws a steady stream of slurry from any angle.

Applications in the heat treat field are many and varied making the Liquamatte a profitable cleaning room machine. Scale is completely removed from precision parts while holding tolerance as close as .0001". "Hand" finishes are produced mechanically in a matter of seconds.

Send today for bulletin No. 23 or ask for a demonstration.

American LIQUAMATTE WET BLASTING

WHEELABRATOR & EQUIPMENT CORP.

855 S. Byrkit St., Mishawaka, Ind.

LETTERS TO THE EDITOR

Dear Editor:

I would appreciate it very much if you would place me on your mailing list for "Metal Treating."

I endeavor to keep up with the latest developments in the heat-treating game and I know of no better way to do this than by receiving your "Metal Treating." If there are any charges for this service, I will be only too glad to cooperate with you.

JACK FINN
Foreman

Donohoo Steel Treating Co.
Bettendorf, Iowa

Dear Editor:

Please send us tear sheets or reprints of the following articles:

Publication: Metal Treating, v. 2, July-Aug. 1951, p. 8, 18, 23.

Article: Hydrogen and Heat Treating, by Carl A. Zapffe.

L. C. TEAGUE
Purchasing Agent

Tennessee Coal, Iron and Railroad Company
Fairfield, Ala.

Dear Editor:

We would appreciate it very much if you would send us a copy of each of two articles entitled

New Quenching Methods Avoid Cracking — Improve Performance by J. H. Chapman, v. 2, May-June 1951, p. 4-5.

Heat Treatment of Plastic Molds by David R. Edgerton, v. 2, May-June 1951, p. 9-11.

Thank you.

E. C. WALLACE
Metallurgist

Barber-Colman Company
Rockford, Ill.

Dear Editor:

I would appreciate it very much if you would place my name on your mailing list to receive the *Metal Treating Journal.*

I feel certain that the information contained in the journal would be very helpful with my work here at Link-Belt Company.

WALTER BECK
Heat Treat Department

Link-Belt Company
Philadelphia 40, Pa.

Dear Editor:

Thank you for the last two editions of Metal Treating.

I find your magazine very interesting and hope you will keep me on your mailing list.

LEO G. MADARD
Heat Treater

Atlas Tack Corporation
Fairhaven, Massachusetts

Dear Editor:

We would appreciate very much being placed on the mailing list for Metal Treating. The information contained in this journal is quite helpful to us.

If there is any formality or cost involved, kindly inform us.

H. P. EVANS
Metallurgist

Boeing Airplane Company
Seattle 14, Washington

Dear Editor:

Will you kindly add my name to your mailing list to receive your publication "Metal Treating," which I am sure will prove to be most helpful to us in our Inspection Laboratory.

Thank you very much for your consideration in this matter.

D. H. REIGHTER
Inspection Lab.

I-T-E Circuit Breaker Company
Philadelphia 30, Pa.

Dear Editor:

I have your letter of December 21, enclosing a copy of November-December Metal Treating, which contained my article on Renegotiation.

There is one change in the text matter which should be called to your attention should any readers get in touch with you. The Renegotiation Board has ruled that, for that period covered by the 1948 Act, the contractor does not pro-rate the number of months into the $100,000.00 minimum, as shown in the first column of Page 7. In other words, regardless of the period of time covered by the '48 Act, the contractor must have $100,000.00 of government orders to be subject to that Act.

Should you have any questions from any readers, I should be most happy to answer them for you.

KENNETH G. SMITH

619 Widener Building
Philadelphia 7, Pa.

You can't take it with you, and since the advent of the income tax, you can't keep it while you are here.

An Eskimo girl greases herself all over before going to bed—Now there's a chick who's really slick.

Maybe it's good that men don't understand women. Women understand women, and don't like them.

"Since taking your tablets regularly, I am another woman. Needless to say, my husband is delighted."

DURABLE...

- Generous Sized Cabinets
- Conditioned Cooling System
- Built-In Checklite System
- Oversized Components
- Filament Voltage Regulation
- Industrial Type Tubes

Durable industrial type tubes—shortened and strengthened internal structure for greater mechanical strength — Kovar metal-to-glass seals to withstand greater thermal shock.

Rugged . . . durable . . . and dependable! Lindberg Induction Heating Units are built like the clipper ship captains of old, who had to be iron men to sail their wooden ships. They give dependable 24 hour a day service under heavy production line requirements. Designed for service . . . day after day . . . month after month . . . far beyond the usual capabilities of Induction heating equipment.

For fast, accurate, versatile selective hardening—controlled in both depth of penetration and area covered—investigate the Lindberg Induction Heating Units. Performance records from plants throughout the nation show 24 hour a day operation—day after day—month after month. Ask for Bulletin 1440.

LINDBERG HIGH FREQUENCY DIVISION

Lindberg Engineering Company, 2450 W. Hubbard Street, Chicago 12, Illinois

MANY VIP IN HEAT-TREAT FIELD HAVE USED PSC 'LIGHT-WEIGHT' EQUIPMENT FOR OVER 20 YEARS

Very Important People Are Perfection Tool and Metal Heat Treating Co. of Chicago, One of Largest Commercial Treaters in Nation. They Have Used PSC Containers Exclusively for Over 20 Years

Pictured at right are views in plant of Perfection Tool & Metal Heat Treating Co. of Chicago, showing PSC heat-treating containers in use. One of the foremost commercial heat-treaters in the country, Perfection has been employing PSC "Light-Weight" equipment exclusively since 1929, the year they placed their first order. Suggesting the many different types of containers and fixtures we supply Perfection, they use thirty different sizes of the carburizing boxes pictured at top.

Among the users of PSC heat-treating units are the majority of the metal-working firms in America today. Many of them have been users since the late 20's when this new light-weight, welded alloy equipment was introduced. PSC units furnished in any size, design or metal specification: annealing and carburizing boxes, fixtures, retorts, covers, etc. Send blue prints or write as to your needs.

PSC "Light Weight"

Heat-Treating Equipment for Any Product and Any Metal

Carburizing and Annealing Boxes
Baskets • Trays • Fixtures
Muffles • Retorts • Racks
Annealing Covers and Tubes
Pickling Equipment
Tumbling Barrels • Tanks
Cyanide and Lead Pots
Thermocouple Protection Tubes
Radiant Furnace Tubes and Parts
Heat, Corrosion Resistant Tubing

THE PRESSED STEEL COMPANY

of WILKES-BARRE, PENNSYLVANIA

Industrial Equipment of Heat and Corrosion Resistant WEIGHT-SAVING *Sheet Alloys*

☆ ☆ ☆ OFFICES IN PRINCIPAL CITIES ☆ ☆ ☆